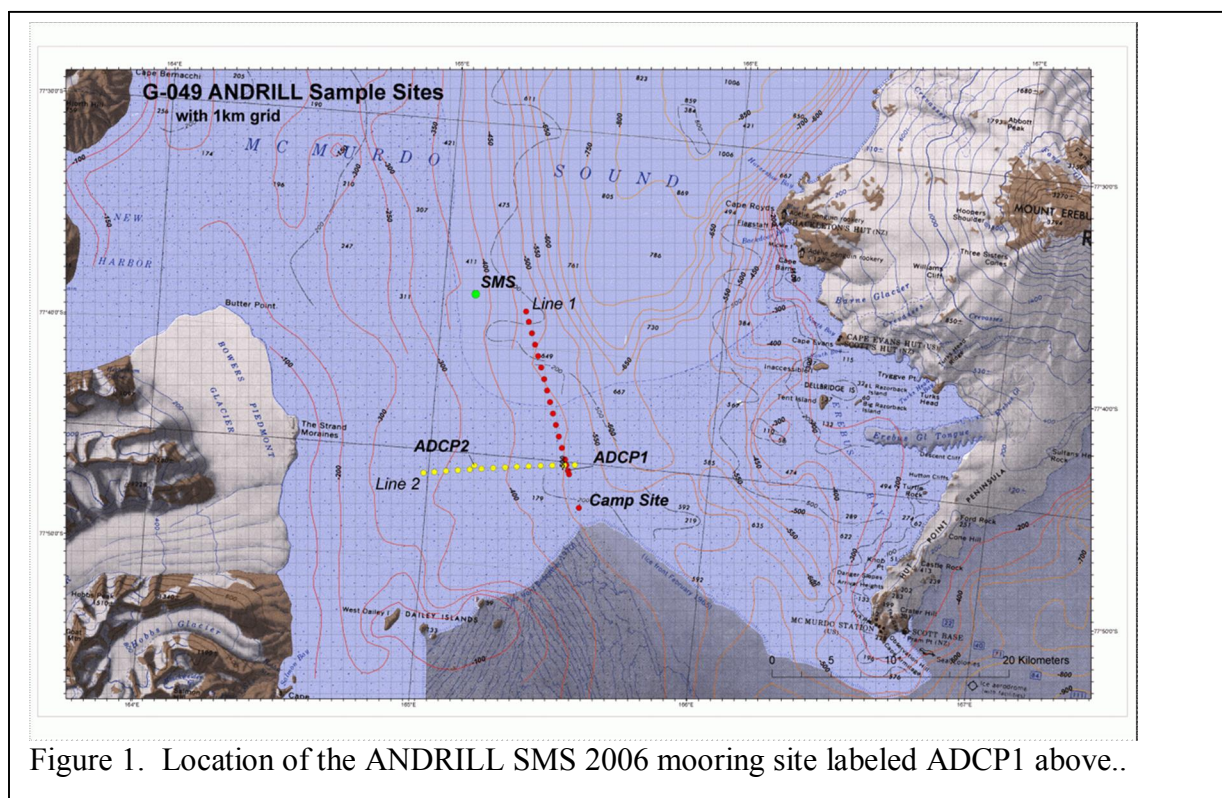


Draft
ANDRILL SMS Mooring Deployment Report
Richard Limeburner, David Harwood and Peter Webb
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Introduction

A current meter mooring was deployed on October 25, 2006 on the frozen surface ice of the Ross Sea in support of the ANTarctic DRILLing (ANDRILL) project by Richard Limeburner (Woods Hole Oceanographic Institution), David Harwood (University of Nebraska), and Peter Webb (Ohio State University). The mooring site is located at the SMS site $77^{\circ} 45.157' \text{ S}$ and $165^{\circ} 29.372' \text{ E}$, approximately 18 miles west northwest of McMurdo Station, Antarctica. The SMS mooring site is normally covered with seasonal sea ice, but at present the region has been permanently frozen for the past 10 years (Figure 1).



The purpose of these moored measurements is to characterize the ocean currents from the near surface (under the 7-m surface ice) to the ocean bottom at a depth of approximately 520-m. These moored observations will be critical to the installation of an ANDRILL drilling platform planned for 2007 at the SMS site.

Instrument Setup

The mooring instrumentation was prepared for deployment at McMurdo Station, Antarctica during October 16-20, 2006. Five Nortek Aquadopp current meters were setup by 1) erasing the existing memory, 2) resetting the instrument clock to GMT, and 3) defining the following sampling scheme.

AquaDopp Current Meter

Deployment : AN0877
Current time : 10/19/2006 5:31:52 AM (GMT)
Start at : 10/19/2006 6:00:00 AM (GMT)
Comment : ANDRILL 2006

Measurement interval (s) : 300
Average interval (s) : 150
Blanking distance (m) : 0.35
Diagnostics interval(min) : 720
Diagnostics samples : 20
Measurement load (%) : 4
Power level : HIGH
Compass upd. rate (s) : 1
Coordinate System : ENU
Speed of sound (m/s) : MEASURED
Salinity (ppt) : 35
File wrapping : OFF

Assumed duration (days) : 60.0
Battery utilization (%) : 201.0
Battery level (V) : 13.7
Recorder size (MB) : 5
Recorder free space (MB) : 5.000
Memory required (MB) : 0.8
Vertical vel. prec (cm/s) : 0.9
Horizon. vel. prec (cm/s) : 0.6

RDI Workhorse 300kHz ADCP

The two RDI Workhorse 300 kHz ADCPs were setup in a similar manner. The ADCP sampling was setup as follows:

Consequences generated by PlanADCP version 2.02:

First cell range = 6.10 m

Last cell range = 110.10 m

Max range = 112.79 m
Standard deviation = 0.38 cm/s
Ensemble size = 688 bytes
Storage required = 5.67 MB (5944320 bytes)
Power usage = 243.33 Wh

Ensemble = 10 minutes
Pings per ensemble = 60
Battery usage = 0.5

Seabird Microcat P/T/C Recorder

Two Sea Bird Microcat 37 SM were setup to sample continuously and record time, pressure, temperature and conductivity data every 5 minutes.

Sea Ice Deployment

We departed McMurdo Station at 0500 GMT on Saturday October 21, 2006 with the mooring equipment, ice melting equipment, and food and camping supplies loaded on a “Piston Bully” track vehicle towing a medium size container-like box on skis and a

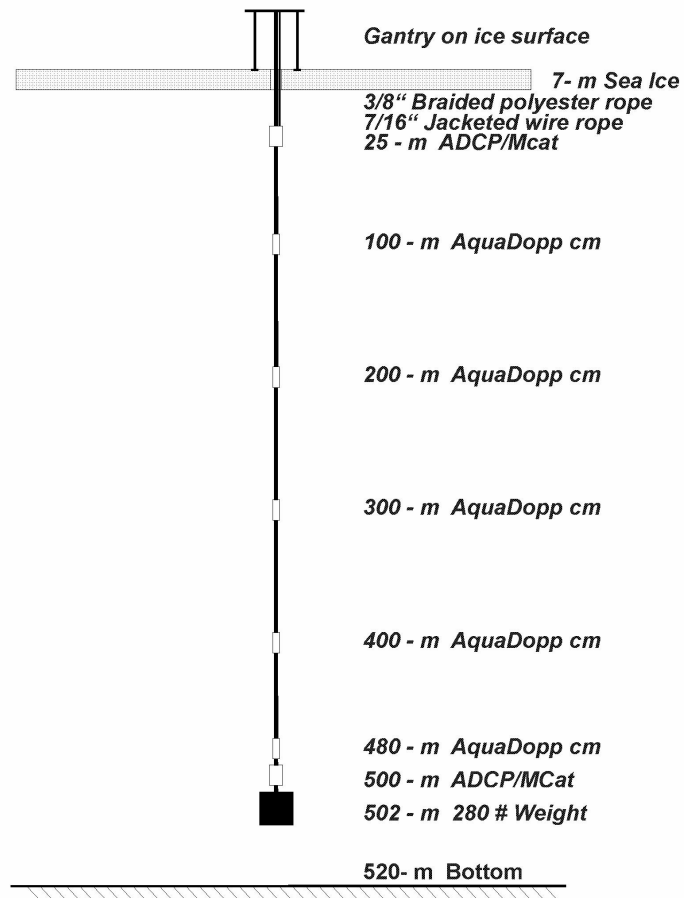


Figure 2. Transport from McMurdo Station to the SMS 2006 mooring site.

Skidoo (Figure 2).

Air temperatures on the Ross Sea ice were generally in the range of -40° to -15° C during October and winds over 25 m/s were common. We arrived at the mooring site after a 4 hour transit in whiteout conditions. The next morning we set up a wooden gantry

ANDRILL SMS Mooring



ADCP - RDI Workhorse 300 kHz Acoustic Doppler Current Profiler
Mcat - Seabird Microcat Pressure/Temperature/Conductivity Recorder
AquaDopp cm - Nortek Acoustic Doppler Current Meter

Figure 3. ANDRILL SMS 2006 mooring schematic.

with blocks and cleats to facilitate the deployment. We then began melting a 24" diameter hole centered on the gantry in the sea ice. The hole melting process was slow

and was done by placing a copper coil heated with glycol on the ice . The coil was attached with 2 pressure hoses to a pump and boiler. Equipment failures were frequent due to the cold harsh operating conditions. Finally, on October 25 the melt hole reached the underlying seawater at a depth of 7-m. We then began deploying the mooring as shown in the schematic in Figure 3. A summary log of the mooring deployment is given next.

October 25, 2006 – 0230z - begin deployment
0244z - anchor in water
0248z - WHADCP #5091 in water (500-m)
- Mcat #3406 in water (499-m)
0303z - AquaDopp #1497 in water (480-m)
0324z - AquaDopp #1495 in water (400-m)
0334z - AquaDopp #1487 in water (300-m)
0347z - AquaDopp #1489 in water (200-m)
0359z - AquaDopp #0877 in water (100-m)
0524z - Mcat #2035 in water (26-m)
0524z - WHADCP #1698 in water (25-m)
0600z - mooring secure

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